

**CHILD RESISTANT CLOSURE SYSTEM**  
**INCLUDING REVERSIBLE CAP AND CONTAINER**

CROSS REFERENCE TO RELATED APPLICATIONS

N/A

STATEMENT REGARDING FEDERALLY SPONSORED  
RESEARCH OR DEVELOPMENT

N/A

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BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to pharmaceutical containers, and more particularly to a pharmaceutical container having a reversible cap adapted for removable attachment to a container in a first configuration wherein removal of the cap is child resistant, and a second, reverse configuration wherein removal of the cap is non-child resistant.

2. Description of Related Art

Various safety closures for containers storing potentially hazardous substances such as prescription pharmaceuticals, medicines, and other chemical compositions are known. Various safety closures have been specifically developed to prevent children from obtaining access to such potentially hazardous substances such as pills in a pill container. Senior citizens and others who do not have children, however, do not require child-resistant safety closures. In fact, many senior

citizens find child-resistant safety closures difficult to open and close, particularly those suffering from arthritis and other abnormalities affecting manual dexterity. To these people, child-resistant safety closures can be a source of frustration.

In an effort to satisfy competing demands for child resistant and non-child resistant closures, closures having two modes of operation have been developed. For example, U.S. Patent No. 3,865,267, issued to Morris, discloses a reversible closure for medicine containers wherein the closure may be affixed to the container in either a child-resistant configuration or a non-child resistant configuration. The upper portion of the closure functions in the non-child proof configuration to secure the closure to the container by inserted engagement of a plug section having a side wall provided with an annular bead to promote a snug engagement when forced into the mouth of the container.

U.S. Patent No. 5,464,110, issued to Heyworth, discloses a double sided reversible container closure and cooperating container having two modes of operation including a child-resistant mode in which the closure is difficult to remove and a conventional mode wherein the closure is relatively easy to remove. In the first mode, the closure is used as a conventional screw-type or snap-on closure and in the second mode the closure must be rotated such that tabs existing on the closure are aligned with gaps formed in beads of the container.

U.S. Patent No. 5,711,442, issued to Kusz, discloses a child-resistant package including a reversible closure for medicine containers wherein the closure may be affixed to the container in either a child-resistant configuration or a non-child resistant configuration. The upper portion of the closure functions in the non-child proof configuration to secure the closure to the container by inserted engagement of a cylindrical plug section having a side wall provided with threads that mate with corresponding threads on the inner surface of the mouth of the container. The lower portion of

the closure functions in the child-proof configuration to secure the closure to the container by threaded engagement between threads defined on the inner surface of the closure skirt and external threads on the outer surface of the mouth of the container, while the cap is locked by engagement of a locking tooth connected to a deflectable tab release element mounted on the vial with one of a plurality of stops defined by the closure.

U.S. Patent Nos. 6,446,823 and 6,523,709, each issued to Meceli et al., disclose a reversible child resistant cap and closure system having two positions, the first being a child resistant position and the other being a non-child resistant position. The closure system disclosed by Meceli provides a reversible cap having a circumferential outer skirt with upper and lower portions extending from a closure plane. The upper portion of the circumferential outer skirt includes an upper portion thereof having a non-child resistant engaging means for engaging the container, such as threads for mating with corresponding threads on the outer surface of the mouth of the container. The lower portion of the circumferential outer skirt includes a child resistant engaging means for engaging the container. In the preferred embodiment the child-resistant engaging means for engaging the container includes adapting the container with projecting camming latches, each having a cam receiving notch therein for receiving a locking lug on the cap when the cap is applied to close the container in the child-resistant position. The cap further includes a depending inner member having a tapered surface that engages the inner surface of the container mouth to form a seal in the child-resistant mode.

The aforementioned attempts to develop child-resistant closure systems have resulted in systems that are adequate for certain applications, the closure systems of the prior art including a number of disadvantages. Since most, if not all, of the closure systems disclosed are fabricated from plastic material, they are generally fragile and easily damaged. With that in mind it is apparent that the Kusz closure system provides threads on the external surface of the upper plug

wall that are unprotected when the cap is affixed to the container in the child-proof configuration thereby exposing the threads to damage. Damage to the exposed threads is likely to render the non child-resistant structure incapable of functioning such that the cap will not threadably engage the container. In addition, the closure system disclosed by Miceli et al. suffers from a similar design flaw. More particularly, Miceli places threads on the inner surface of the upper portion of a circumferential outer skirt. The relatively flimsy outer skirt is also vulnerable to impact damage or permanent deformation thereby rendering the non-child resistant structure difficult to attach to the container. Accordingly there exists a need for an improved reversible closure system for containers.

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#### BRIEF SUMMARY OF THE INVENTION

The present invention overcomes the disadvantages and shortcomings present in the art by providing a reversible closure system for containers wherein a cap is adapted as a closure that may be reversible affixed to the container in either a child-resistant configuration or a non-child resistant configuration. In a preferred embodiment the closure system of the present invention includes a generally cylindrical container and mating reversible cap. The cap includes an upper portion adapted to function in a non-child resistant closure mode, and a lower portion adapted to function in a child-resistant closure mode. The upper portion of the cap functions in a non-child resistant configuration to secure the cap to the container by inserted engagement of a cylindrical plug section having a side wall provided with threads that mate with corresponding threads on the inner surface of the mouth of the container. The upper portion further includes an outer skirt in surrounding relation with the plug section to shield and protect the threads on the plug section from damage. The lower portion of the cap functions in a child-resistant configuration to secure the cap to the

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container by engagement of locking lugs on the cap with lug receiving cam structures defined on the outer surface of the container. The cap further includes a resilient insert that functions in the child-resistant mode to provide resilient sealing contact with the upper end of the container without deforming the neck of the container.

5           Accordingly, it is an object of the present invention to provide an improved closure system for containers.

          Another object of the present invention is to provide a container having a reversible cap adapted for removable attachment to a container in a first configuration wherein removal of the cap is child-resistant, and a second, reverse configuration wherein removal of the cap is non-child  
10   resistant.

          Still another object of the present invention is to provide a closure system wherein a cap is provided with an upper portion adapted for non-child resistant engagement with a container wherein the engaging threads are protected from damage by a surrounding shield.

          Yet another object of the present invention is to provide a closure system wherein a cap is  
15   adapted with a resilient insert for providing sealing engagement with a container without deforming the mouth of the container in a child-resistant configuration.

          In accordance with these and other objects, which will become apparent hereinafter, the instant invention will now be described with particular reference to the accompanying drawings.

## 20           BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

          FIG. 1 depicts a container and cap in accordance with a preferred embodiment of the present invention wherein the cap is oriented for engagement in a child-resistant mode;

FIG. 2 depicts the container and cap with the cap oriented for engagement in the non-child resistant mode;

FIG. 3 is a plan view of the cap upper portion;

FIG. 4 is a plan view of the cap lower portion;

5 FIG. 5 is a perspective view of the cap; and

FIG. 6 is an exploded side view of the cap and insert.

### DETAILED DESCRIPTION OF THE INVENTION

With reference now to the drawings, FIGS. 1 - 6 depict a reversible closure system  
10 according to the present invention, generally referenced as 10. In a preferred embodiment closure system 10 includes a generally cylindrical container 12 and mating reversible cap 14. Closure system 10 comprises a reversible closure system for containers wherein cap 14 is adapted for reversible attachment to container 12 in either a child-resistant configuration, or a non-child resistant configuration. FIG. 1 depicts cap 14 relative to container 12 prior to attachment in the  
15 child-resistant configuration, and FIG. 2 depicts cap 14 relative to container 12 in an inverted position prior to attachment to container 12 in a non-child resistant configuration. Container 12 and cap 14 are preferably fabricated from plastic material, such as polyethylene or polypropylene. Further, container 12 and cap 14 may be of any suitable size.

Container 12 is preferably a generally cylindrical container having a closed bottom 20 and  
20 an open top portion 22. Top portion 22 is adapted with internal threads 24 disposed on the inner surface thereof proximal the upper peripheral edge thereof. Top portion 22 further includes a plurality of radially outwardly projecting cam latch structures 26 disposed on the outer surface thereof. Each cam latch structure 26 includes a cam receiving notch 28 for receiving a locking lug

projecting from cap 14 as further discussed below. In a preferred embodiment, four (4) cam latch structures are disposed in circumferentially spaced relation around the periphery of the outer surface of the top portion 22 of container 12, however, any suitable number is considered within the scope of the present invention.

5           Cap 14 includes an upper portion 30 adapted to function in a non-child resistant closure mode, and a lower portion 32 adapted to function in a child-resistant closure mode. The upper portion 30 of cap 14 includes an axially aligned cylindrical plug portion 34. Plug portion 34 includes a generally cylindrical outer side wall having radially projecting threads 36 thereon. Plug portion 24 is sized for mating threaded engagement with inner threads 24 on the top portion 22 of  
10 container 12 as indicated by the pre-attachment disposition of the components depicted in FIG. 2. The upper portion 30 of cap 14 further includes a circumferential outer skirt 38 disposed in radially spaced surrounding relation with plug portion 34 and functions to shield threads 36 and the surface upon which threads 36 are formed from damage. Outer skirt 38 does not otherwise function to engage the container when cap 14 is secured thereto in the non-child resistant configuration.  
15 Accordingly, the upper portion 30 of cap 14 functions in a non-child resistant configuration to secure cap 14 to container 12 by threaded engagement of cylindrical plug 34 with corresponding threads on the inner surface of the mouth of the container.

          The lower portion 32 of cap 14 defines an outer skirt 40 having a plurality of locking lugs 42 projecting radially inwardly from an inner surface of outer skirt 40. In the preferred embodiment, a  
20 total of four (4) locking lugs are provided to correspond with the preferred total of four (4) cam latch structures 26 existing on the outer surface of container 12. The use of similar cam latch structures on reversible closures is disclosed in U.S. Patent No. 5,934,492, the disclosure of which is hereby incorporated herein by reference. Outer skirt 40 functions in a child-resistant configuration

to secure cap 14 to container 12 by engagement of locking lugs 42 within notches 28 of cam latch structures 26 when cap 14 is attached to container 12, as indicated by the pre-attachment disposition of the components depicted in FIG. 1.

Cap 14 further includes a resilient insert 50 insertably disposed within cap 14 as illustrated in FIG.1. Insert 50 is configured to engage the uppermost peripheral edge of container 12 as cap 14 is placed thereon in the child-resistant configuration. More particularly, insert 50 is positioned within cap 14 so as to initially contact the uppermost peripheral edge of container 12 when cap 14 is placed thereon, a configuration in which lugs 42 are positioned for initial contact with cam latch structures 26. As cap 14 is rotated and pressed onto container 12, is caused to flex toward the upper portion of cap 14 by the uppermost peripheral edge of container 12 thereby forming a tight seal around the uppermost peripheral edge of container 12 without causing radial deformation of the mouth of the container.

The instant invention has been shown and described herein in what is considered to be the most practical and preferred embodiment. It is recognized, however, that departures may be made therefrom within the scope of the invention and that obvious modifications will occur to a person skilled in the art.